

5.0 ENVIRONMENTAL IMPACTS

The potential environmental impacts from the proposed action are described in the following sections. DOE has made modifications to the proposed action that eliminate or mitigate potential impacts and/or concerns that were identified during the public review of the draft EA.

5.1 GEOLOGY AND SOILS

No borrow material will be used from Pit 30 or any other on-site borrow area. Grout would be formulated offsite for the demonstration project. Any borrow material used in the production of the grout would be obtained from an offsite commercial facility. There would be no substantial impacts to geologic or soil resources created by the ATCD Project. The project would not be subject to any unusual risks due to a seismic event on the Hanford Site.

5.2 SURFACE WATER

There would be no impacts to surface waters from the ATCD Project. There are no naturally occurring water bodies near the C tank farm. The ATCD Project does not involve dredging or filling activities in any surface water; therefore Section 404 of the *Clean Water Act* does not apply. The project would not require any new Section 402 discharge permits.

There would be no impacts to wetlands or designated floodplains from the ATCD Project. There are no wetlands or designated floodplains in the project area.

5.3 GROUNDWATER

The ATCD Project would not be expected to affect the vadose zone or the groundwater contaminant levels in a negative manner. The TWRS EIS developed a set of bounding assumptions to evaluate groundwater impacts from releases during retrieval and residuals (DOE/EIS-0189, Appendix F, Section F.4.6.1).

Retrieval for C-106 is basically completed and the planned retrieval action would utilize lower liquid volumes, have less hydraulic pressure, and the sluicing liquid would spend less time in the tank than under typical sluicing operations. The remaining activities associated with final retrieval and grout placement in the demonstration present considerable less risk of release than the resulting analysis conducted in the TWRS EIS based upon the assumptions used. Following Phase I grout placement, the residuals remaining in the tank, per M-45 requirements, would be more isolated and immobilized than they are now.

5.4 AIR

The ATCD Project will comply with air pollution control regulations governing non-radioactive airborne emissions, radioactive airborne emissions, and radiation protection of the public and the environment (RPP-11094). To achieve compliance, a high-efficiency air filtration system would be used during fill placement in tank C-106 to minimize the potential for toxic or radioactive air emissions. Construction traffic could generate some fugitive dust. As appropriate, fugitive dust

suppression measures (e.g., water spray or surfactants) would be used at the C-106 tank site. Therefore, no substantial adverse impacts to air quality are anticipated.

5.5 BIOLOGICAL RESOURCES

The land in the ATCD Project area and the proposed staging area is heavily disturbed. The tank farms underwent extensive excavation when the tanks were installed underground. The staging area is located in a previously disturbed area where overhead and underground utility lines were constructed. The activities of the ATCD Project would be conducted in these previously disturbed areas, so there would be no significant direct or indirect effect to biological resources or their habitat as a result of the ATCD Project. The biological survey of the 200 East Area concluded that:

- No plant and animal species protected under the Endangered Species Act, candidates for such protection, or species listed by the Washington State were observed.
- No adverse impacts to species or habitats of concern are expected to occur from the maintenance, operation, or characterization activities at 200 East or West tank farms and associated support facilities.

5.6 LAND USE

The Central Plateau (200 East and West Areas) are designated as an "industrial-exclusive" area capable of supporting waste treatment, storage, and/or disposal activities for hazardous, dangerous, radioactive, nonradioactive wastes and related activities. There would be no change in land use as a result of the ATCD Project. Because there are no lands designated as prime farmlands in the ATCD Project area, there would be no impacts to such lands by the ATCD Project. The ATCD Project is consistent with the current land use designation for the 200 Areas and would not affect the land use of the area.

5.7 TRANSPORTATION

The workforce for the ATCD Project would average about 20 workers and the project material needs are minimal. There would not be a substantial increase in the existing Hanford Site workforce or material transportation activities; therefore, there would be no substantial impact to traffic circulation, volume, or parking access caused by the project.

5.8 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The ATCD Project would be conducted within the boundaries of the 200 East Area of the Hanford Site and specifically in areas in and adjacent to the C tank farm. There would be no substantial impact to the socioeconomics of the Hanford Site or the surrounding communities created by the ATCD Project. The workforce for the ATCD Project would average about 20 workers from the current site workforce. This is less than 1% of the existing Hanford Site workforce.

There would be no high or disproportionate adverse health or socioeconomic impacts to minority or low-income populations as a result of the ATCD Project.

5.8.1 Utilities

The ATCD Project would not require construction or development of new permanent utility lines. Existing services have adequate capacity to meet the needs of the ATCD Project. Temporary services from the existing utility system onsite would be used.

5.9 HUMAN HEALTH AND SAFETY

Short-term human health risk analysis is to estimate the potential health impacts from both accident and normal (nonaccident) conditions resulting from various scenarios for tank 241-C-106 and the C tank farm during closure activities. The analysis identifies the potential accidents associated with construction and operation activities. The hazards associated with these activities include potential occupational hazards resulting in physical trauma and radiological exposure resulting in latent cancer fatalities (LCFs). Initiating events that could result in hazardous health effects may include natural phenomena, human error, component failure, and spontaneous reactions. Health risks during normal conditions include anticipated exposure to radiation fields and radiological releases to the atmosphere during normal closure activities.

Tank filling will present potential exposures to workers and the general public. Worker and general public exposure scenarios were developed for tank (i.e., component) closure activities. The preliminary scenario presented in this document is Phase I grouting (i.e., stabilizing grout) and represents the type of exposure that is expected based on planned tank closure activities. Various options for tank filling following waste retrieval will be evaluated.

Because the short-term human health risks will be encountered in the near future while the site is under physical and administrative control of the U.S. Department of Energy, it can be reasonably anticipated that the tank closure activities will be conducted in a manner that maintains exposure to tank wastes as low as reasonably achievable through the use of engineering controls and protective equipment. It is assumed that after final closure of the tanks, short-term human health risk will be fully mitigated and will not be considered further. This is consistent with the regulatory definition of closure of a treatment, storage, and/or disposal facility (i.e., no further active site management required).

5.9.1 Occupational Accident Risk

The potential exists for accidents (e.g., cuts, falls) to occur resulting from construction and operation activities associated with component closure (i.e., tank closure). The occupational injuries, illnesses, and fatalities resulting from potential accidents are calculated based on the following assumptions:

- Tank 241-C-106 labor requirements for Phase I grouting of the tank
 - Phase I grouting of tank = 3,800 hours

- Phase I grouting of all C farm tanks = 60,800 hours.
 - Hanford-specific incidence rates for occupational accidents
 - Total recordable cases = 1.93×10^{-5} total recordable cases/hour
 - Lost workday cases = 8.04×10^{-6} lost workday cases/hour
- Fatalities = 1.35×10^{-8} fatalities/hour.

The potential incidences resulting from occupational accidents are presented in Table 5-1.

Table 5-1. Worker Risk From Occupational Accidents

Case	Incidence	Tank	
		241-C-106	All
Phase I grouting of tank 241-C-106	TRC	7.33 E-02	NA
	LWC	3.06 E-02	NA
	Fatalities	5.13 E-05	NA
Phase I grouting of all C farm tanks	TRC	NA	1.17 E+00
	LWC	NA	4.89 E-01
	Fatalities	NA	8.21 E-04

LWC = lost workday cases.
NA = not applicable.
TRC = total recordable cases.

5.9.2 Radiological Accident Risk

Currently, no safety assessment for closure activities have been performed. Past safety assessments were used for the radiological accident risk. A spectrum of potential accidents associated with from tank 241-C-106 is reviewed in *Safety Assessment for Tank 241-C-106 Waste Retrieval Project W-320* (WHC-SD-WM-SAD-024). Several of the more bounding accidents identified in the safety assessment are summarized in Table 5-2.

5.9.3 Routine Radiological Exposure Risk

The involved worker population dose resulting from construction and operations is based on worker exposures to support closure of tank 241-C-106. The involved worker MEI dose is based on a current site administrative control of 0.5 rem/year. The LCF risk to the various receptor populations and MEIs are presented in Table 5-3.

Table 5-2. Preliminary Hazard Analysis

Accident	Consequences	Mitigative/Preventive Barriers		Severity Level	Probability
		Administrative	Engineered		
Opening a riser ^a	Increases exposure to worker from direct radiation and release of radiological contaminants	Surveillance by radiation protection technician Radiological workers will wear personal protective gear while removing risers	Radiation detectors	Low	Likely
Flammable gas deflagration ^b	Energy from deflagration could compromise the tank dome or ventilation system resulting in release of radiological contaminants and exposure to the workers Potential trauma to workers from deflagration	Flammable gas control	Tank ventilation system	High	Extremely unlikely
Spray leak from transfer line ^a	Spray leak from transfer line resulting in release of radiological contaminants and exposure to the workers	Operator surveillance	Cover block over jumper pit Leak detection Radiation detectors	High	Unlikely
Ventilation failure ^a	Ventilation failure resulting in unfiltered release of radiological contaminants and exposure to the workers	Evacuation procedures	Differential pressure alarms	High	Extremely unlikely
Natural phenomena ^a	Seismic event compromises waste tank or transfers lines resulting in release of radiological contaminants and exposure to the workers	Evaluation procedures	Seismic switch on transfer pump	Medium	Extremely unlikely

^aAccident taken from WHC-SD-WM-SAD-024.

^bAccident taken from 10245-CD-006.

Table 5-3. LCF Risk From Routine Radiological Exposure

Receptor	C-106	Worst Case Composite Tank	Regulatory Limit
IW MEI	2.00 E-04	2.00 E-04	2E-3
IW Pop	5.92 E-03	5.92 E-03	NA
NIW MEI	3.76 E-08	1.68 E-10	2E-3
NIW Pop	1.78 E-06	7.93 E-09	NA
GP MEI	9.00 E-12	4.05 E-14	2E-3
GP Pop	1.80 E-07	8.10 E-10	NA

GP MEI = general public maximum exposed individual.
 GP Pop = general public population.
 IW MEI = involved worker maximum exposed individual.
 IW Pop = involved worker population.
 NA= not applicable
 NIW MEI = noninvolved worker maximum exposed individual.
 NIW Pop = noninvolved worker population.

5.10 CULTURAL RESOURCES

There are no known cultural resources within the ATCD Project site. The tank farms underwent extensive excavation when the tanks were installed underground. The ATCD Project staging area is located in a previously disturbed area where overhead and underground utility lines were constructed. Since there are no ground disturbing activities planned or anticipated in connection with the ATCD Project, it is unlikely that any archaeological or historic archaeological resources would be encountered during the demonstration. However, if cultural resources were encountered during the demonstration, work would be halted and the DOE-RL Manager of the Hanford Historical and Cultural Resources Program would be notified to determine the appropriate disposition of the resource and any mitigative actions that would be required prior to continuing with the project. Structural effects to the C-106 tank have been mitigated as required under Stipulation VI of the Historic Buildings Programmatic Agreement (DOE/RL-96-77).

5.11 VISUAL RESOURCES AND NOISE

The ATCD Project would only temporarily modify the visual appearance near C tank farm. Once the ATCD Project is completed, the views in and around the tank farm would return to pre-project conditions.

The ATCD Project would use industrial equipment that would not constitute a substantial increase in current noise levels. Because of the size of the Hanford Site, its scattered facilities, and its largely undeveloped nature, site activities generally have no offsite noise impacts. Noise levels from the ATCD Project would be short-term, limited to the duration of the demonstration activities, and would not be permanent or long term.

5.12 CUMULATIVE IMPACTS

The operations and maintenance activities at the Hanford Site employ between 10,000 and 11,000 employees. The average number of workers for the ATCD Project is about 20, less than 1% of the total Hanford Site labor force. This labor force would not substantially contribute to the cumulative socioeconomic impacts to the community. There would be no high or disproportionate adverse impacts to minority or low-income populations. The activities do not represent a substantial impact on worker and public health and safety.

The traffic generated by the construction of the Waste Treatment Plant consists of employee traffic to and from the construction site, employee travel to North Richland, and shipments to the site. During the period from 2002 to 2006, the additional traffic is expected to increase trips 13 to 32% during the peak commuter periods (Pertee Engineering 2001). Traffic generated by the ATCD Project would be within the existing traffic volumes and would not contribute to the cumulative impacts to the transportation system of the site or the surrounding communities.

The impact evaluations presented in this EA have concluded that there would be no substantial direct or indirect impacts associated with the project. In the reasonably foreseeable future, decisions will be made concerning how the Hanford tank farm systems will be closed. This demonstration project is consistent with the options for tank farm closure being evaluated in the Tank Closure EIS and does not foreclose the selection or implementation of any future closure option.

Because there are no substantial adverse impacts from the proposed action, there would be no substantial contribution to Hanford Site cumulative impacts.

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